

PASAG Status Report

S. Ritz

steve.ritz@nasa.gov or ritz@scipp.ucsc.edu

HEPAP Meeting
22 May 2009

Activities Thus Far

- Charge accepted by HEPAP end of February 
- Panel membership in place 12 April
- First meeting (by phone) 20 April, formed subgroups now at work (both by phone and email) on:
 - Dark Matter
 - Dark Energy
 - Cosmic rays, Cosmic Gamma rays, Cosmic Neutrinos
 - CMB and "other"
- Given timeline and work, attempting to do as much as possible with frequent phone meetings.
 - Weekly timeslot for full panel phone calls, along with subgroup calls.
- Planning F2F meetings in June and July

Charge (1 of 4)

- http://www.science.doe.gov/hep/panels/subpanel_list.shtml



U.S. Department of Energy
and the
National Science Foundation



FEB 24 2009

Professor Mel Shochet
Chair, HEPAP
Enrico Fermi Institute
University of Chicago
Chicago, Illinois 60637

Dear Professor Shochet:

The scientific opportunities for the U.S. particle physics program have been most recently identified and articulated by the Particle Physics Project Prioritization Panel (P5) report submitted in May 2008. The agencies have found this report to be informative and useful in their planning. At this time, we would like to explore in further detail the opportunities and scientific challenges available at the Cosmic Frontier, and we are requesting that HEPAP initiate a Particle Astrophysics Scientific Assessment Group (PASAG) to address these questions.

In particular, we request that the PASAG re-examine current and proposed U.S. research capabilities in particle astrophysics, assess their role and potential for scientific advancement, and determine the time and resources (the operations costs, facilities, personnel, research and development and capital investments) needed to achieve an optimum program in the context of various budgetary scenarios indicated below. PASAG should then identify and evaluate the scientific opportunities and options that can be pursued at these different funding levels for mounting a world-class program that addresses the highest priority science in particle astrophysics.

Charge (2 of 4)

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The scientific scope of this review should be limited to opportunities that will advance our understanding of the fundamental properties of particles and forces using observations of phenomena from astrophysical sources. To be specific, we consider the following scientific areas to be within the scope of this study: exploring the particle nature of dark matter, understanding the fundamental properties of dark energy, and measuring the properties of astrophysically generated particles (including cosmic rays, gamma rays, and neutrinos). Some of these areas have been previously studied in some detail by other ad hoc panels and advisory groups (such as the Dark Matter Science Assessment Group, Dark Energy Task Force, etc.) and the PASAG should make use of this existing body of work. Some of the research areas identified above will be within the scope of the National Research Council's Astronomy and Astrophysics Decadal Survey (Astro2010) and the Organization for Economic Cooperation and Development (OECD) Global Science Forum's Working Group on Astroparticle Physics. An appropriate sharing of information should be explored.

These evaluations should be done in the context of the increasing internationalization of particle astrophysics, while recognizing the need to maintain a healthy, flexible, domestic research infrastructure, and respecting the funding agencies' different but complementary scientific missions and the varied ways they intersect with this research. Your report should provide recommendations

Charge (3 of 4)

on the priorities for an optimized particle astrophysics program over the next ten years (FY 2010-2019), under the following four funding profile scenarios:

1. Constant effort at the FY 2008 funding level (i.e., funding in FY 2010 at the level provided by the FY 2008 Omnibus Bill, inflated by 3.5% per year and continuing at this rate in the out-years)
2. Constant effort at the FY 2009 President's Request level (i.e., funding in FY 2010 at the level provided by the FY 2009 Request, inflated by 3.5% and continuing at this rate in the out-years).
3. Doubling of funding over a ten year period starting in FY 2009 (i.e., funding in FY 2010 at the level provided by the FY 2009 President's Request, inflated by 6.5%, and continuing at this rate in the out-years)
4. Additional funding above funding scenario 3, in priority order, associated with specific activities needed to mount a leadership program that addresses the scientific opportunities identified in the EPP2010 or P5 reports.

Details of current funding for particle astrophysics, outyear planning, operations costs and project profiles will be provided to the PASAG by the agencies.

Charge (4 of 4)

The report should discuss the facilities and instrumentation that can be used to carry out the current program as well as new facilities -- including dedicated research centers, as appropriate -- and instrumentation that will need to be developed by the DOE and NSF in order to mount a productive, forefront program for each of the funding scenarios. The report should articulate the scientific opportunities that can and cannot be pursued and the impacts on training of physicists as well as the broader scientific community under each of the funding profile scenarios. For example, continued operations of existing facilities will have to be balanced against the opportunities to develop new or upgraded facilities with advanced capabilities. The report should also provide a detailed perspective on how the pursuit of possible major initiatives would complement the program you recommend in each of the scenarios.

We would appreciate the committee's preliminary comments by July 1, 2009 and a final report by August 15, 2009. We understand this is a difficult task; however, your considerations on these issues will provide essential input for both the DOE and NSF planning.

Sincerely,



Dr. Dennis Kovar
Associate Director
for High Energy Physics
Office of Science
Department of Energy



Dr. Tony Chan
Assistant Director
Mathematical and Physical Sciences
National Science Foundation

update: preliminary
comments by early-
mid August

Activities Thus Far

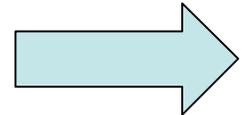
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PASAG Members

- G. Bernstein (Penn)
- F. Calaprice (Princeton)
- M. Carena (FNAL)
- T. Gaisser (Bartol)
- L. Gladney (Penn)
- A. Harding (GSFC)
- M. Kamionkowski (Caltech)
- R. Ong (UCLA)
- S. Ritz (GSFC, UCSC)
- J. Ruhl (CWRU)
- A. Seiden (UCSC)
- I. Shipsey (Purdue)
- H. Sobel (Irvine)
- C. Spiering (DESY)
- M. Shochet (Chicago, *ex-officio*)

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Methodology

- Subgroups working in parallel to collect information and draft the main issues that the full panel will address.
- Attempting to collect most of the information without individual project presentations (impractical on this timescale). Subfields have different histories.
 - Some have had relatively recent SAGs, so PASAG is an update.
 - Some (e.g., CR/Gamma/Nu) have not had recent assessments, so will have individual project presentations.
- Also planning a presentation on how the labs think about Particle Astrophysics.
- Community interactions are important.
 - evening session at the recent APS meeting (4 May)
 - suggestions, please!

Request for Information from DM Experiments

As you have probably heard, a new HEPAP subpanel, PASAG (http://www.science.doe.gov/hep/panels/subpanel_list.shtml), has been formed to advise the agencies on particle astrophysics. The direct detection of dark matter is included in the subjects to be reviewed. Since this topic was extensively discussed in the DMSAG report, our plan is to start with what has happened since that report was issued. Could you please summarize within a few pages:

- what progress has taken place, what new directions are being explored, and what are your immediate and future plans?
- Please specify the major technical issues that are being addressed in the current work, and provide a rough schedule for achieving the major milestones needed before starting the next large-scale detector.

If there is additional information on the web you want us to consider, please provide the URLs. In addition, our intention is to try to fit a comprehensive program into the various funding profile scenarios that we have been given, so we would like to understand your budget needs and the project time schedules. Since the subpanel is working on a very tight schedule, we would appreciate it if you could get this information to us by May 15.

Request for Information from HE CR/Nu/Gamma Experiments

As you have probably heard, a new HEPAP subpanel, PASAG (http://www.science.doe.gov/hep/panels/subpanel_list.shtml) has been formed to advise the NSF and DOE on particle astrophysics. High-energy cosmic-ray, gamma-ray and neutrino astrophysics are among the subjects to be considered. This request for information covers both projects being proposed and those that are already in operation or commissioning phases:

- PROPOSED PROJECTS: Since many of you have already submitted responses to the RFI for the Decadal Survey (Astro2010), we plan to use a similar format and scope to collect information. Thus we ask that you limit the length to up to 10 pages in one of the standard formats (pdf, doc, ps) and include URLs to other information that you want us to know about. Please include a description of the main science goal(s) of the project and a description of the technical approach. We would like to know the planned schedule for the activity and key information about the readiness of the technology being considered.
- PROJECTS IN OPERATION OR COMMISSIONING: We request a short summary (up to 3 pages) of your plans. If significant upgrades are foreseen, please treat those as proposed projects with format as described above.

The charge for PASAG calls for us to fit a comprehensive program into the various funding profile scenarios that we have been given, so we would like to understand your budget needs and timelines. Since the subpanel is working on a very tight schedule, we would appreciate it if you could email this information to us by May 26. After we receive initial responses we may request a presentation from the larger proposed projects. Please let me know if you have any questions or concerns.

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Discussion